V. Observations on the organs of vision in bats

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a foil, a stream from the Nile, which however would be indispensibly necessary to feed it, since it ought not, and even could not be dug to the bottom, or to the level of the two feas.

There is however one important remark still to be made, which is, that the present trade of Egypt with Asia is carried on merely by caravans, and by two different ways; one entirely over land across the isthmus and sands for 50 or 60 leagues, even to Syria; and another by a defile among the mountains of Upper Egypt, for 25 or 30 leagues only, from Cophtos to Coseir, which is a port of the Red Sea much easier of access than Suez, because the sea there is broader and much less dangerous. But as this defile seems to be favourable to a canal, which might be fed equally well and with more ease from the Upper Nile, and as that river is navigable to Cophtos as well as to Grand Cairo, there is every appearance that a canal in the latter situation, planned with the same care, would be more sure as well as more advantageous to the nation that might have the sovereign possession of Upper as well as Lower Egypt, especially as it is absolutely necessary that it should be sufficiently powerful to subdue the Bedouins, who infest the whole country, and who would soon render the canal of Cairo as impracticable as that of Cophtos.

V. *Observations on the Organs of Vision in Bats.*

By M. SPALLANZANI

THESE observations are extracted from a small work published by M. Spallanzani a few years ago, under the following title: "An account of some species of bats, which, when deprived of sight, perform their movements in the air as if they still saw: a faculty not possessed by other birds under the like circumstances." And the author says that he was led to them by some experiments which he made on
night

night birds. He let loose several birds in a chamber perfectly dark, and perceived that the bats flew about in it without any impediment, and neither rushed against any thing in the apartment, nor touched the walls with their wings. He at first imagined that they were conducted by some glimpse of light which he did not perceive, and on that account he blindfolded them with a small and very close hood. They then ceased to fly; but he observed at the same time, that this did not proceed from any deprivation of light, but rather from the constraint thence occasioned, especially when a hood of a very light texture was attended with the same effect.

He then conceived the idea of pasting up the eyes of the bats with a few drops of size or gum; but they still flew about in the same manner as if their eyes had been open. As this however was not sufficient, he pasted up the eyes of these animals with round bits of leather, and this even did not impede them in their flight.

That he might at length be certain of his object, he blinded them entirely, either by burning the cornea with a red hot wire, or by pulling out the pupil with a pair of small pincers, and scooping out the eye entirely. Not contented even with this precaution, he covered the wounds with pieces of leather, that the light might have no influence whatever on the remains of the organs which had been destroyed. The animals seemed to suffer very much by this cruel operation; but when they were compelled to use their wings, either by day or by night, and even in an apartment totally dark, they flew perfectly well, and with great caution, towards the walls, in order to suspend themselves when they wished to rest. They avoided every impediment great or small, and flew from one apartment to another, backwards and forwards, through the door by which they were connected, without touching the frame with their wings. In a word, they shewed themselves as bold and lively in their

flight as any other animals of the same species which enjoy the use of their eye-sight.

M. Spallanzani tried the same experiments with the same result on the eyes of the horse-shoe bat (*vespert. ferrum equinum*), the dwarf-bat, the great bat (*noctula*), and the bat of Buffon. M. Spallanzani is convinced that the other four senses still remaining to these animals cannot supply the want of sight; and he is therefore of opinion that a *new organ*, perhaps a *new sense*, which is wanting in the human species, may in them be put in activity by their being blinded. Professor Vassalli at Turin, Professor Rossi at Pisa, M. Spadone at Bologna, and M. Jurine at Geneva, repeated these experiments, and observed the same phenomena as those mentioned by Spallanzani,

VI. Experiments on Bats deprived of Sight by M. DE JURINE.

From the Journal de Physique for 1798.

THE experiments of M. Jurine were made only on the long-eared bat (*vespertilio aurilus*), and the horse-shoe bat (*vespert. ferrum equinum*). The bats were procured from the vaults under the fortifications of Geneva in the months of December and January. The author first obviates some doubts respecting the places where these animals reside in winter, as some of them have been found in a torpid state in the trunks of old trees during that season.

The author observes, that he found at the above season, and in the same vaults, abundance of moths (*phalænæ*) and crane-flies (*tipulæ*), and thinks he here discovers one of those wise dispensations of nature, by which other animals of more utility find a source of aliment when they could procure nothing in the atmosphere at that rigorous season.

The long-eared bat has six incisive teeth in the under jaw, three-lobed, and cut into the form of a heart. The upper has
four,